

Industry involvement in Engineering Education

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Engineering Centre for Excellence in Teaching & Learning engCETL Linking Education with Industry



Employer Engagement

- Government agenda to upskill the workforce
- HEFCE policy
- Leitch Report
- Role of HE?

The CETL Programme

- HEFCE's largest initiative for L&T (£319M)
- 74 CETLs funded, 2005-10
- engCETL funding £2.5M recurrent, £1.65M Capital



Basis of the CETL Bid

- Engineering Education Centre
 - Faculty funded since 1997 (3 core, 7-9 project staff)
 - Produced 80 internal projects
 - £3M in national & european funded L&T projects
 - Distance Learning Materials
 - Learning Technologies
 - PDP
 - Gender Balance

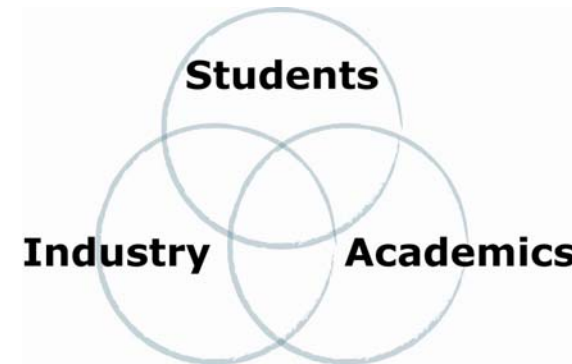
- Strong industry links through academic Departments
 - University strategy

Mission Statement & Aims

To be recognised as the UK centre for excellence in the research, development and provision of engineering education through an active involvement with industry



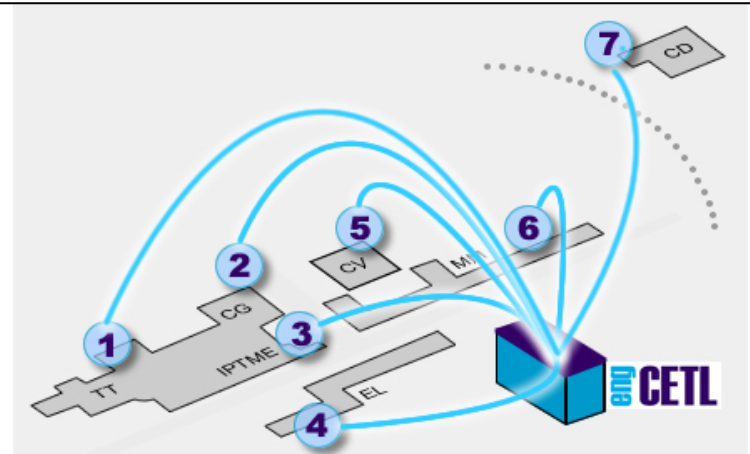
1. To enhance the student learning experience.
2. To achieve a cultural change that supports a reflective and evidence-based approach to teaching.
3. To facilitate the production of graduates who are employable, enterprising, productive and innovative.
4. To be innovative, with a key focus on technology-enhanced teaching and learning.
5. To support, recognise and reward those who work towards achieving the engCETL aims.
6. To demonstrate impact and sustainability of the engCETL work.



engCETL

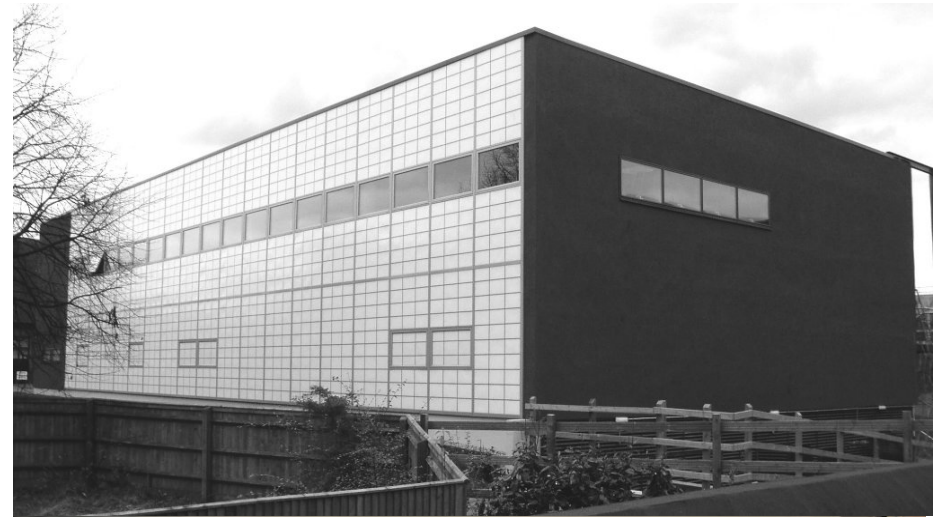
- 7 core departments
- Faculty and university level links
- Embedded in University Teaching and Learning Strategy
- 14 core staff + 7 Project Staff + 4 PhD students, some university funded some external project funding
- 7 seconded academics

1. Aeronautical & Automotive Engineering
2. Chemical Engineering
3. Institute of Polymer Technology & Materials Engineering
4. Electronic & Electrical Engineering
5. Civil & Building Engineering
6. Mechanical & Manufacturing Engineering
7. Design & Technology





engCETL Building



Capital fund secured 550 m² of floor space in a building already under construction

- Learning Space
- Staff offices

Student focussed learning space



Test bed for AV and learning technology

Specified by the staff who teach design
A 50-70 seat studio
Four 16 seat studios



Simulates commercial environment



Informal use by students



Student Focus

- Students and recent graduates on Advisory Board
- Student focus groups (e.g. group projects)
- Employing students to produce case studies
 - Formula Student
 - Reflections on and evaluation of the student experience
- Links to student groups in other CETLs



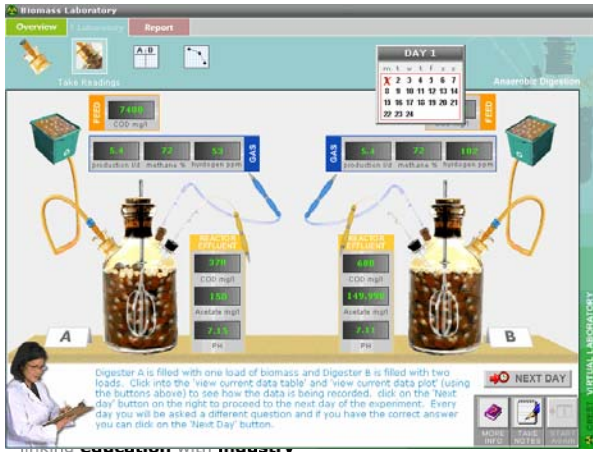
Industry Focus

- Industry membership on the Advisory Board
- Working with existing industry sponsors and advisory panels in departments
- Industrial Liaison Officer developing new contacts for teaching
 - Working with placement tutors
 - New placements secured in Chemical Engineering
 - Working with alumni in renewable energy (SME) to set and mentor current MSc projects for students
 - Seeking to improve continuity of contacts between department and industry



Academic Focus – Technology Enhanced Learning

- Virtual laboratories
- Computer Assisted Assessments
- Electronic Personal Development Planning
- Web based tracking of pastoral care meetings with students (15,000 records per annum)
- Online peer assessment of group work (WebPA)
- 80 projects completed



attendant helping to record attendance

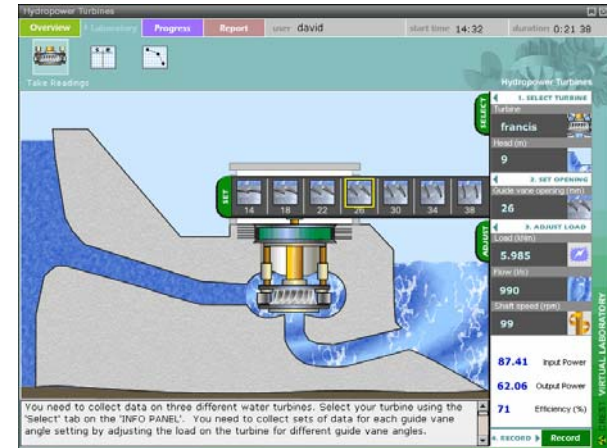
Melanie Bates
Demonstration Department

per student/ID | per module code | compare all modules

Tables showing attendance on modules (%) per week for each Semester.

Printer friendly version

SEMESTER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	no. of registers	Module Average %
03sem001	80	90	100	90	90	90	90	90	90	90	90	90	90	90	90	7	90
03sem002	90	100	90	100	90	100	90	100	90	100	90	90	90	90	90	7	93.3
03sem003	80	100	90	100	90	100	100	90	90	100	90	90	90	90	90	7	92.9
03sem004	90	90	100	90	100	100	100	90	90	100	100	90	90	90	90	7	94.3
03sem005	100	90	90	100	100	100	100	90	90	100	100	100	100	90	90	7	95.7
03sem006	100	100	100	90	90	100	100	90	90	100	100	100	100	90	90	7	92.9
03sem007	100	100	100	90	90	100	100	90	90	100	100	100	100	90	90	7	97.1
03sem008	50	50	90	80	80	80	80	80	80	80	80	80	80	80	14	71	
03sem009	60	100	90	90	100	100	90	90	90	90	90	90	90	90	14	95	
03sem010	100	80	80	100	90	100	90	90	90	90	90	90	90	90	7	88.8	
03v001	80	90	90	100	90	100	90	90	90	90	90	90	90	90	7	93.4	
03v002	90	90	80	100	100	100	90	90	90	90	90	90	90	90	7	93.4	
03v003	90	90	100	90	90	90	90	90	90	90	90	90	90	90	3	93.3	



Academic Focus –Curriculum Development

Teamwork & Leadership

- Civil, Mechanical & Materials Engineering Students
- 4 day Outdoor Management Course
- Comparative study with other types of delivery
- engCETL funding to set up the transfer



Formula Student

- Student produced case studies
- Student sourced Industry sponsors
- Related work now embedded in modules in automotive, mechanical, materials and electrical programmes

- Design teaching
- Enterprise
- Ethics



Pedagogic Research

- Pedagogic Research Workshops
- 2 Research Associates
(1 university funded)
 - Design projects with industry
 - Evaluation of aeronautical design & build
 - Virtual laboratories and distance learning
 - Industrial placements
 - Credit for work based learning
 - Internationalisation
 - Learning spaces



Pedagogic Research

- 4 PhD Students
 - Skills development on industrial placements
 - Impact of sponsorship on students, academics and employers
 - Project based learning
 - Pilot plant remote laboratory



Student Sponsorship Research

Project outcome **Develop sustainable models of effective practice for further dissemination**

- Benefits to students, departments and industry
- Impact of sponsorship on the undergraduate programs & student employability
- Students' view on sponsorship
- Sponsorship attraction to companies
- Barriers that limit further collaboration

Student Sponsorship Research

- Starting with Civil & Building Engineering sponsorship consortiums in place for over 15 years
- Involvement of consortium partners
 - Recruitment and Selection (construction)
 - Student bursary
 - Placement
 - Maintain contact with students
 - Input into curriculum
 - Teamwork and Leadership module

Sponsorship Research

- Starting with Civil & Building Engineering sponsorship consortiums in place for over 15 years
- Collaborating with ICE , Surrey & Southampton
- Will include different models in Manufacturing and Systems engineering



Dissemination & Evaluation

- HE Academy Engineering Subject Centre
 - Projects including: employer engagement
 - Resources / events e.g. ethics, case studies
- East Midlands CETL Network
 - 9 CETLs: Loughborough/Nottingham/Leicester
- Evaluation
 - 2 External Evaluators
 - Current work on learning space and learning technology resources



Employer Engagement

- Government agenda to upskill the workforce
- DFES/HEFCE policy
- Leitch Report
- Role of HE?

Strategic drivers

- Leitch Review of Skills
 - Rapid demographic change, global economic integration
 - High skills workforce, demand-led provision
- HEFCE Employer Engagement Strategy
 - Funded initiatives
 - LLNs, HLS pathfinders, employer engagement pilots, FL pathfinders
 - Workplace learning research
- Grant letter to HEFCE (2007)
 - Employer engagement
 - Growth strategy, at least 5,000 additional entrants year on year
 - Employer demand-led funding
 - Close working with LSC

Some extracts from Leitch

- Skills focus
- Demographic change – 70% workforce of 2020 already there
- 40% adults qualified to Level 4 (v 29% in 2005) : 5.5 million more attainments by 2020
- HE growth “Unlikely to be achievable by expanding current model of HE”
- Employer voice dominates demand-led system, to avoid planning from supply side
- Role of Sector Skills Councils
- Qualifications accredited from FE and Employers

Funding

- Gov invests 1.1% GDP in UK in HE c.f. 2.9% USA, 2.6% South Korea, 2.4% Canada
- Funding per student has halved over 20 yrs in UK
- Review of HE funding in 2009
- Employers and individuals pay bulk of additional funding for level 4

Subject Centre Employer Engagement Project

- Subject centre pilot project with
 - Sector Skills Councils, FDF
 - EPC, ECuk, EEF, NEF
 - Academics
 - Subject centres Engineering, Materials, Physical Sciences
- Four Themes
 - Levers & enablers (inc funding & accreditation)
 - Work-Based Learning/Programme Delivery
 - Staff Development/management of change
 - Building partnerships

Conclusion

- Most engineering provision in HE engages with industry
- engCETL is researching and developing existing links to produce sustainable models and exploring new areas
- National employer engagement strategy
 - Opportunity of growth in numbers but not in traditional students
 - Vision is for employer / demand-led funding
 - Upskilling in the workplace requires further development of the pedagogy and QA